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branches, but it remains to be proved that these cells are motor. A medullated nerve fibre is never seen to break up into branches within the gray matter, though it is always possible that it may become non-medullated and then branch. Kölliker inclines to the hypothesis that the different nerve centres are united by medullated fibres, which arise directly from the finest branches of those nerve cells where the axis-cylinder forms a network in such a manner that either each branch, or several of them together, form the axis cylinder of this medullated fibre.

*Studien über den centralen Verlauf der vasomotorischen Nervenbahnen.*

HELWEG. Arch. f. Psychiatrie XIX, 1, S. 104.

In sections of the cervical cord from insane subjects, where the principal tract of the lateral columns abuts on the anterior nerve roots, the author finds, in carmine preparations, a wedge-shaped mass of fibres which are very fine and intensely stained. Besides this "triangular tract," there are scattered fibres of abnormally small size through other parts of the lateral column, and also in the anterior column. The size is looked on as due to arrested development. The formation has been traced as far cephalad as the commissura posterior and into the lemniscus. Since the abnormally small calibre of the fibres is always associated with a psychosis, and since in all psychoses one system only is invariably affected, namely, the vasomotor, therefore he feels justified in designating this tract as a vasomotor one, and goes on to give the probable terminations of the tract in the cerebral cortex.

*Die Temperaturschwankungen des Gehirns in Beziehung zu Gemüths-emotionen.* E. TANZI. Originalmittheilung, Centralbl. f. Physiologie, 12 Mai 1888, No. 3.

The description of Tanzi's own experiments is preceded by a succinct account of the investigations in this line by Schiff (1870) and Corso (1881). As regards the single fact of the variations in temperature, the two investigators reach results directly opposed, for while Schiff finds that, in general, the rousing of an emotion is accompanied by a rise of temperature in the brain, Corso finds it to be accompanied by a fall.

Tanzi experimented on six dogs and two monkeys, and sought the answer to the following questions: 1. Whether temperature changes in the cortex followed various stimuli. 2. Supposing such changes to take place, in what hemisphere and in what region of the hemisphere they occurred. 3. The kind of change, whether a rise or fall of temperature. 4. The approximate intensity of the change. 5. In what form do they express themselves subjectively, as a simple sensation, or as an emotion. 6. On what physical or physiological conditions do they depend, the circulation of the blood, or metabolism of brain substance.

For the method of investigation the original should be consulted, but it may be here noticed that the animal was sometimes so arranged that the variations in the cortex and in the lumbar region of the cord could be taken almost simultaneously. As stimuli the following were used: Loud sounds, threats, the odor of meat and urine, stimulation of the vulva, petting; to a bitch her puppies were shown, and to a monkey that had formed the alcohol habit, wine

was offered, and in every case the effect of the idea of release was tried by slightly loosening some of the cords binding the limbs.

The variations in the volume of the brain were also registered, so that any change in the quantity of blood in the cranial cavity was recorded. The conclusions are thus stated: 1. Deep narcosis, great fear or pain place the animal in a condition where no change in the temperature of the cortex follows the stimulus. On, however, relieving any of these conditions, the temperature changes at once appear. Repetition of an adequate stimulus finally fails to cause any thermal reaction. When the cortex does not react, there are still continuous and marked changes in the temperature of the cord. As soon, however, as the temperature changes in the cortex appear, those in the cord become inconspicuous. It is not denied that in the cases where the stimulus fails to produce a thermal change, the excitation does not reach the cortex, but it is maintained that the condition of the cortex is not such that a diffused excitation can take place, and such as is necessary to the development of an emotion.

2. The thermal variation occurs over the entire brain, being localized neither in one part of one hemisphere, nor in one hemisphere alone as distinguished from the other.

3. The changes which have been observed are hardly ever of the nature of a simple rise or fall of temperature, but almost always an alternation of rise with fall, which may continue without much regularity for one or two minutes. The temperature of the cortex is varied thus rhythmically above and below an isotherm which represents the temperature of the cortex in an unexcited condition. The same type of changes was observed in the spinal cord.

4. The variations amounted in some cases to  $3^{\circ}\text{C}$ . above as well as below the normal.

5. These oscillations accord best with the view that one has to do with a diffused emotional condition rather than with a simple localized sensation. The grounds for this view are, the inconstancy of the phenomenon, its duration, its distribution over almost the entire cortex in both hemispheres, the variable intensity according to the psychological conditions, and the intensity which in some cases was attained.

6. That these changes in temperature are independent of variations in the circulation seems probable for the following reasons: The sighing of the animal and the variation in the circulation brought about by stimulating the vagus, cause little thermal variation. The inhalation of amyl nitrite causes a rise of temperature in the cortex after some time; but the oscillations, so typical of the other temperature changes, are here wanting. If the volumetric changes in the brain were an index of the changes in the circulation, then there was no connection between changes in the circulation and those of temperature.

It therefore appears as certain, according to Tanzi, that the most various stimuli, in so far as they are capable of arousing emotions, bring about diffused temperature variations in the cortex; these are oscillatory, a rise alternating with a fall; they can be extensive, stand in a close relation to the intensity of the emotions, are independent of the rhythms of the circulation or respiration, and appear, on the contrary, dependent on a rhythmic metabolic activity.